

Appl. No. 10/692,969
Reply to Office Action of: June 28, 2006

Attorney Docket No. 10541-1898

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III. Remarks

Reconsideration and re-examination of this application in view of the above amendments and the following remarks is herein respectfully requested.

After entering this amendment, Claims 1-13 remain pending. Claims 1, 3, and 13 have been amended. Support for the above amendments is found in Applicants' specification as originally filed.

In the Specification

Specification paragraphs [0024] and [0026] have been amended to address clerical errors. Entry of these amendments is respectfully requested.

Allowable Subject Matter

The undersigned acknowledges the Examiner's indication of the allowance of Claim 13, if rewritten into independent form, including all of the limitations of any base claim and intervening claims.

Accordingly, Claim 13 has been rewritten into independent form. Since a dependent claim inherently includes the limitations of its base claims and any intervening claims, the rewriting of Claim 13 into independent form is properly considered a non-narrowing amendment.

In view of the above, Applicants respectfully submit that Claim 13 is allowable and such action is requested.

Claim Rejections - 35 U.S.C. § 112

Claims 2-3 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the applicant regards as the invention. Specifically, the Examiner has stated that Claim 3 fails to incorporate all of the elements of Claim 2, since Claim 2 calls for an outboard inner race supported on said bearing shaft, while Claim 3 calls for an outboard inner race integrally formed within the bearing shaft. Accordingly, Claim 3 has been amended to depend from Claim 1 while continuing to incorporate all of the limitations of Claim 2, except that Claim 3 comprises an outboard inner race integrally formed within said bearing shaft and not supported on said bearing shaft.

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Accordingly, it is believed that this rejection is now moot and should be withdrawn, and Applicants respectfully request that the Examiner take such action.

Claim Rejections - 35 U.S.C. § 102

Averill et al.

Claims 1-7 and 10-12 were rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,557,660, to Averill et al. ("Averill"). Applicants respectfully traverse these rejections.

Independent Claim 1, from which Claims 2-7 and 10-12 depend, is directed toward a wheel end assembly having a bearing shaft with an inboard end and an outboard end, the outboard end having a wheel hub mounted thereto. The bearing shaft includes a wheel bearing that is mounted between the inboard end and the outboard end and held in place by a flange portion. A detachable outboard joint is mounted onto the inboard end of the bearing shaft. Claim 1 further calls for a support hub that is positioned between the detachable outboard joint and the bearing shaft. The support hub has a shaft portion engaging the bearing shaft and an engagement portion that extends axially from the shaft portion. Furthermore, Claim 1 is currently amended to clarify that the engagement portion is attached to the outboard joint so as to prevent axial movement between the engagement portion and the outboard joint. Claim 1 is also currently amended to state that the shaft portion engages the bearing shaft on an inner diameter of the bearing shaft.

Averill discloses a hub lock for two-wheel/four-wheel drive vehicles. Averill teaches a wheel end assembly comprising a wheel hub 46 that has an inboard and an outboard end, a hub flange 56, which holds the wheel to the wheel hub, and a detachable outboard joint 52 mounted onto the end of the wheel hub 46. The wheel hub 46 has ball bearings 66 and the inboard end of the wheel hub includes an end 100 that is roll formed against an inner race 62. Averill further shows a clutch ring 106 that is slidably engaged to the wheel hub 46 and slidable into engagement with the detachable outboard joint 52.

Applicants respectfully submit that Averill fails to disclose a support hub as required by Claim 1. The clutch ring 106 shown in Averill, which is characterized as a "support hub" by the Examiner, is not a support hub; rather, it is a ring used to

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couple the wheel hub into movement with the shaft when four wheel drive is engaged. Furthermore, Claim 1 is currently amended to state that the engagement portion of the support hub is attached to the outboard joint so as to prevent axial movement between the engagement portion and the outboard joint. Therefore, Claim 1 is further distinguished over Averill because the clutch ring 106 in Averill is attached to the outboard joint 52 so as to permit axial movement therebetween. In fact, the clutch ring in Averill must be able to move axially in order for the four wheel drive system to work.

Because Averill fails to teach a support hub that has an engagement portion attached to an outboard joint so as to prevent axial movement between the engagement portion and the outboard joint, Applicants respectfully submit that Averill fails to teach each and every element of the present invention. Accordingly, Applicants respectfully submit that independent Claim 1, and Claims 2-7 and 10-12 dependent therefrom, are in condition for allowance. Therefore, reconsideration and withdrawal of the rejection is requested.

Boulton et al.

Claims 1 and 4-9 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,354,952, to Boulton et al. ("Boulton"). Applicants respectfully traverse these rejections.

Various relevant features and elements of independent Claim 1, from which Claims 4-9 depend, are discussed above in connection with the rejection based on Averill. That discussion is applicable to the present rejection and is herein incorporated by reference.

Boulton teaches a wheel end assembly comprising an inner part of a wheel bearing 25 having an inboard end and an outboard end, the outboard end including a wheel hub. A detachable outboard joint 35 is mounted onto the inboard end. The inboard end includes a swaged inner end 33. Between the inner and outer bearing parts are two rows of bearing balls 30. The inner race of the right hand row of bearing balls 30 is provided by a ring 31. The ring 31 is held in position by a further ring 32, which in turn is held in position by the swaged inner end 33 (Col. 4, lines 48-53) (Examiner has referred to the swaged inner end 33 as the flange portion). Both of rings 31 and 32 are located on an outer diameter of the wheel bearing 25. An

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internally splined ring 40, which is secured to the CV joint 35, fits on the splines 34 of the ring 32 (Col. 4, lines 58-59). The rings 32 and 40 are held together by a spring ring 41 received in an internal groove of the ring 40 and an external groove and the ring 32 (Col. 4, lines 59-62).

Boulton fails to disclose a support hub having a shaft portion engaging the bearing shaft and an engagement portion extending axially from the shaft portion. Ring 32 is not a support hub, and it does not have a shaft portion engaging the bearing shaft and an engagement portion extending axially from the shaft portion. If Ring 32 is defined to be the shaft portion engaging the bearing shaft, there is nothing extending axially from the shaft portion of Ring 32 to define an engagement portion. If Ring 32 is defined to be the engagement portion of the support hub, it does not extend axially from the shaft portion.

Furthermore, Boulton fails to disclose a support hub having a shaft portion that engages the bearing shaft on an inner diameter of the bearing shaft, as required by amended Claim 1. The ring 32, identified by the Examiner as a "support hub", engages the wheel hub 25 on an outer diameter of the wheel hub 25.

Because Boulton fails to teach a support hub having a shaft portion engaging the bearing shaft on an inner diameter of the bearing shaft and an engagement portion extending axially from the shaft portion, Applicants respectfully submit that Boulton fails to teach each and every element of the present invention. Accordingly, Applicants respectfully submit that independent Claim 1, as well as Claims 4-9 dependent therefrom, are in condition for allowance. Therefore, reconsideration and withdrawal of the rejection is respectfully requested.

Uchman

Claims 1 and 5-7 were rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,648,518, to Uchman ("Uchman"). Applicants respectfully traverse these rejections.

Various relevant features and elements of independent Claim 1, from which Claims 5-7 depend, are discussed above in connection with the rejection based on Averill. That discussion is applicable to the present rejection and is herein incorporated by reference.

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Uchman teaches a wheel end assembly comprising a wheel hub 12 having an inboard end and an outboard end, a detachable constant velocity joint 10 mounted onto the inboard end of the wheel hub 12, and ball bearings 19 and 21. The inboard end of the bearing shaft includes an outwardly swaged portion 26, which preloads the bearing 21 between the hub 12 and the fixed portion 17, by preloading the separate race ring 24 (Col. 2, lines 63-65). The swaged portion 26, engages the right end of the securing ring 28 which engages the race ring 24. The securing ring 28 includes splines on an inner surface that are in contact with the wheel hub 12 and splines on an outer surface in contact with the constant velocity joint 10. The securing ring 28 engages the wheel hub 12 on an outer diameter of the wheel hub 12.

Uchman fails to teach a support hub that has a shaft portion engaging a bearing shaft and an engagement portion extending axially from the shaft portion. The ring 28 of Uchman is not a support hub. Furthermore, Figure 1 shows splines 38 and 42 on either surface of the securing ring 28. The splines are located radially from each other; there is not an engagement portion extending axially from the shaft portion.

Furthermore, Uchman fails to teach a support hub with an engagement portion that is attached to the outboard joint so as to prevent axial movement between the engagement portion and the support hub. Uchman merely shows the securing ring 28 being splined to the outboard connecting joint. The engagement portion is not connected to the outboard joint in such a way as to prevent axial movement therebetween.

Additionally, Uchman fails to teach a shaft portion of a support hub engaging the bearing shaft on an inner diameter of the bearing shaft. The securing ring 28 of Uchman engages the wheel hub 12 on an outer diameter of the wheel hub 12.

Because Uchman fails to show a support hub having a shaft portion engaging the bearing shaft on an inner diameter of the bearing shaft and an engagement portion extending axially from the shaft portion, and further, because Uchman fails to show an engagement portion of a support hub that is attached to the outboard joint to prevent axial movement between the engagement portion and the outboard joint, Applicants respectfully submit that Uchman fails to teach each and every element of the claimed invention. Accordingly, Applicants respectfully submit that independent

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Claim 1, as well as Claims 5-7 dependent therefrom, are in condition for allowance. Therefore, reconsideration and withdrawal of the rejection is respectfully requested.

Webb et al.

Claims 1, 2, and 5 were rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent Publication No. 2003/0063827, to Webb et al. ("Webb"). Applicants respectfully traverse these rejections.

Various relevant features and elements of independent Claim 1, from which Claims 2 and 5 depend, are discussed above in connection with the rejection based on Averill. That discussion is applicable to the present rejection and is herein incorporated by reference.

Webb discloses a wheel end assembly that has a spindle 12 having an inboard end and an outboard end, a wheel hub that is part of the outboard end, a CV joint K that is mounted onto the inboard end, and two cones 28 and 30 that are mounted onto the races of the bearing shaft between the inboard end and the outboard end. The spindle 12 includes a formed end 22 (identified by Examiner as the flange portion). The wheel end assembly includes a connect-disconnect ring 116 having an internal spline 118 that allows the ring 116 to slidably connect to another spline located on a large extension 110 of the inboard cone 30 (Para. [0032], lines 8-19). The connect-disconnect ring 116 is located exterior to the spindle 12.

Webb fails to disclose a support hub that is positioned between and interconnecting the detachable outboard joint and the bearing shaft. The ring 116 in Webb is not positioned between the spindle 12 (referred to by Examiner as the bearing shaft) and the CV joint. The ring 116 is located exterior to both the spindle 12 and the CV joint K, and it never comes in contact with the spindle 12, which the Examiner has characterized as the bearing shaft 12.

Webb also fails to teach a support hub having a shaft portion engaging the bearing shaft on an inner diameter of the bearing shaft, as required by the currently amended Claim 1. Webb shows the ring 116 being located only exterior to the spindle 12 (characterized by Examiner as a bearing shaft).

Furthermore, Webb fails to teach an engagement portion of a support hub that is attached to the outboard joint so as to prevent axial movement between the

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engagement portion and the outboard joint, as required by the currently amended Claim 1. In Webb, the ring 116 is free to move axially between the CV joint K and the large extension 110 along splines 112 and 114.

Because Webb fails to teach a support hub positioned between and interconnecting the detachable outboard joint and the bearing shaft, and furthermore because Webb fails to teach a support hub having a shaft portion engaging the bearing shaft on an inner diameter of the bearing shaft and an engagement portion of the support hub that is attached to the outboard joint so as to prevent axial movement between the engagement portion and the outboard joint, Applicants respectfully submit that Webb fails to teach each and every element of the claimed invention. Accordingly, Applicants respectfully submit that Claim 1, and Claims 2 and 5 dependent therefrom, are in condition for allowance. Therefore reconsideration and withdrawal of the rejection is respectfully requested.

Claim Rejections - 35 U.S.C. §103(a)

Claim 3 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Webb as applied to Claim 2 above, and further in view of Boulton. Applicants respectfully traverse this rejection.

Examiner has stated that Webb et al. does not teach the outboard inner bearing race ring being integrally formed with the bearing shaft. Examiner has stated that Boulton et al. does teaches such a feature and that it would have been obvious to one skilled in the art at the time the invention was made to modify the bearing arrangement of Webb as taught by Boulton.

Applicants respectfully submit that the elements included in the base claim (Claim 1), from which Claim 3 depends, are patentably distinct from the teachings of Webb and Boulton in light of the current amendments to Claim 1, among other reasons. Particularly, neither Boulton nor Webb discloses a support hub that is positioned between and interconnecting the detachable outboard joint and the bearing shaft, the support hub having a shaft portion engaging the bearing shaft on an inner diameter of the bearing shaft and an engagement portion extending axially from the shaft portion, wherein the engagement portion is attached to the outboard

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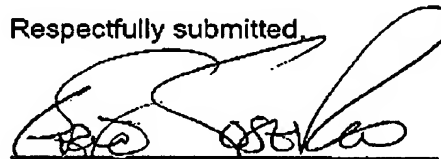
joint so as to prevent axial movement between the engagement portion and the outboard joint.

Since Claim 3 depends from Claim 1, which Applicants respectfully submit is patentable for at least the reasons given above, Applicants respectfully submit that Claim 3 is also patentable for at least these reasons. Therefore, Applicants respectfully request that the rejection under 35 U.S.C. § 103(a) be withdrawn.

Conclusion

In view of the above amendments and remarks, it is respectfully submitted that the present form of the claims are patentably distinguishable over the art of record and that this application is now in condition for allowance. Such action is requested.

Respectfully submitted,

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